Gender differences in primary grade level students in tests of visual and auditory memory

Kathleen P. Leland
Rowan University

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GENDER DIFFERENCES IN PRIMARY GRADE LEVEL STUDENTS
IN TESTS OF VISUAL AND AUDITORY MEMORY

By
Kathleen P. Leland

A Thesis
Submitted in partial fulfillment of the requirements of the
Master of Arts Degree in the Graduate Division
of Rowan University
July 2, 1998

Approved by
Professor

Date Approved
July 2, 1998
The purpose of this study was to discover if gender is a significant factor when determining the auditory and visual memory skills of primary grade level students. The study also sought to determine if boys or girls are more able to recall visual or auditory stimuli. Based on the literature related to the subject of gender and memory, differences between males and females vary depending on the tasks performed.

The subjects were taken from first, second and third grade students attending a suburban elementary school in New Jersey. Fifty-two boys and fifty-three girls were subjected to a story on an audio tape then tested to determine their ability to remember the auditory material. Thereafter, forty-six boys and fifty-two girls were exposed to a video tape then tested to determine their ability to remember the material on the video. The tests were separated by gender and graded on a scale from 0 to 9. The mean, median and mode of the boys' auditory tests were determined, as well as the mean, median and mode for the girls' auditory tests. The same statistical procedures were performed for both the boys' and girls' visual tests. A two-way Analysis of Variance was then performed on the scores to ascertain whether a significant difference existed between the boys' scores on the two tests and the girls' scores on the two tests.

Although the boys scored higher on both tests than did the girls, no significant difference was found between the overall scores comparing the two tests in the Analysis of Variance.
MINI-ABSTRACT

Kathleen P. Leland
Gender Differences in Primary Grade Level Students in Tests of Visual and Auditory Memory
1998
Dr. Randall Robinson
Master of Arts Degree in the Graduate Division

Do gender differences exist in primary grade level children? If so, do primary grade level males and females exhibit differences in the way they remember both auditory and visual stimuli? A two-way Analysis of Variance was the statistical procedure used to determine whether memory differences exist between first, second and third grade males and females. Based on the findings of this study, it was discovered that no significant differences exist between the way boys and girls remember both auditory and visual stimuli.
Table of Contents

<table>
<thead>
<tr>
<th>ACKNOWLEDGEMENTS</th>
<th>iv</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF TABLES</td>
<td>v</td>
</tr>
</tbody>
</table>

CHAPTER

1. SCOPE OF STUDY 1

   Introduction 1
   Purpose of the Study 2
   Statement of the Problem 2
   Hypothesis 2
   Limitations 3
   Definition of Terms 3

2. REVIEW OF RELATED LITERATURE 5

   Introduction 5
   The Existence of Gender Stereotypes 5
   Stereotypical Behavior 6
   Gender-typical Tasks 7
   Gender and Recall in Adults and Children 8
   Gender and Cognitive Style 8
   Gender Differences in Problem Solving Ability 9
   Conclusion About Gender and Memory Based on Research 10

3. PROCEDURES 12

   Introduction 12
   Population 12
   Sample 12
   Procedure 13
   Description of Instruments 15
   Statistical Procedures 16

4. ANALYSIS OF FINDINGS 17

   Introduction 17
<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tabulation of Raw Scores</td>
<td>17</td>
</tr>
<tr>
<td>Tabulation of the Two-way Analysis of Variance Scores</td>
<td>19</td>
</tr>
<tr>
<td>Analysis Related to Particular Purpose of Hypothesis</td>
<td>20</td>
</tr>
<tr>
<td>5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS</td>
<td>21</td>
</tr>
<tr>
<td>Introduction</td>
<td>21</td>
</tr>
<tr>
<td>Summary of the Problem</td>
<td>21</td>
</tr>
<tr>
<td>Summary of the Hypothesis</td>
<td>22</td>
</tr>
<tr>
<td>Summary of the Procedure</td>
<td>22</td>
</tr>
<tr>
<td>Summary of the Findings</td>
<td>23</td>
</tr>
<tr>
<td>Conclusions</td>
<td>24</td>
</tr>
<tr>
<td>Implications and Recommendations</td>
<td>25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SELECTED BIBLIOGRAPHY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>APPENDIX A</td>
<td>28</td>
</tr>
<tr>
<td>APPENDIX B</td>
<td>31</td>
</tr>
<tr>
<td>APPENDIX C</td>
<td>34</td>
</tr>
<tr>
<td>APPENDIX D</td>
<td>37</td>
</tr>
<tr>
<td>VITA</td>
<td>40</td>
</tr>
</tbody>
</table>
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# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Subjects Who Heard the Audio Cassette</td>
<td>13</td>
</tr>
<tr>
<td>2. Subjects Who Viewed the Video Cassette</td>
<td>13</td>
</tr>
<tr>
<td>3. Tabulation of Raw Scores of Auditory Test</td>
<td>18</td>
</tr>
<tr>
<td>4. Tabulation of Raw Scores of Visual Test</td>
<td>19</td>
</tr>
<tr>
<td>5. Tabulation of the Two-way Analysis of Variance (ANOVA)</td>
<td>20</td>
</tr>
</tbody>
</table>
Chapter 1
Scope of Study

Introduction

Although there is a wealth of information and research on the issue of gender stereotypes, whether women have greater recall than men for gender specific tasks, little research apparently exists which compares males and females on visual and auditory recall abilities. Furthermore, there is no research comparing the memory of males and females at the primary school level. It would be important to ascertain whether the classic stereotypes are meritorious and whether there is any ground for an assumption of stereotypical behavior. An actual two-test study comparing primary grade level boys and girls in both visual and auditory memory would assist educators in their analysis of gender-specific traits. Tests of these types would also help educators regulate their methodologies in the classroom for the interest of every student.

Gender-specific traits, according to current research, are those tasks which are stereotypically male, such as remembering road directions, or stereotypically female, such as remembering items on a grocery list (Herman, 1992). Research done by Young & Wilson (1994) implies that no difference exists between females and males in overall recall ability. If the same conclusions apply to visual and auditory memory skills, teachers could integrate both auditory and visual materials into the classroom to stimulate learning.
Purpose of the Study

The purpose of this study was to discover if gender is a significant factor when determining the auditory and visual memory skills of primary grade level students. Based on the literature related to the subject of gender and memory, differences between males and females vary depending on the tasks performed. This study, therefore, sought to ascertain if gender differences exist in first, second, and third grade males and females. The study also sought to determine if boys or girls are more able to recall visual or auditory stimuli.

Statement of the Problem

This study sought to answer the following questions: Do gender differences exist in primary grade level children? If so, do primary grade level males and females exhibit differences in the way they remember both auditory and visual stimuli? If exposed to visual stimuli, will boys and girls recall the material they saw at a different or equal rate? If exposed to auditory stimuli, will boys and girls recall the material they heard at a different or equal rate?

Hypothesis

The hypothesis of this study suggested that no significant difference exists between primary grade level males and primary grade level females on tests of visual and auditory memory.
Limitations

The study was limited in the following ways:

First, the subjects were not randomly selected, but were taken from one specific school which was assigned to the researcher as part of a student-teaching experience. Since the researcher was familiar with most of the subjects being tested, it was impossible to determine whether or not the researcher showed any biases in conducting the study. A random sample would have lessened the opportunity for researcher bias.

Second, the tests which were administered were constructed by the researcher. This factor presented a risk to the validity of the study itself, as well as to the reliability of the tests administered.

Third, there were certain risks to construct validity in that the tests themselves may not have been an accurate measure of recall ability.

Fourth, since memory is difficult to ascertain, the students may not have been remembering the material but simply guessing. Therefore, results of the study may have been skewed to reflect this differential.

Fifth, the research was not experimental in nature, and it was impossible to assume that gender was the cause of variation between visual and auditory recall. A causal-comparative study was limited to comparing the subjects as separated by gender and their mean scores for both the auditory and visual portions of the test.

Definition of Terms

For the purposes of this study, the following definitions applied:
Visual recall - memory for things which have been seen, such as a story shown on a video. Visual recall also relates to the ability to accurately answer questions based on a video shown to the subjects of this study.

Auditory recall - memory for things which have been heard, such as a story played on an audio cassette. Auditory ability also relates to the ability to accurately answer questions based on an audio cassette played for the subjects of this study.

Primary grade level students - those students attending first, second and third grade, or those children who are approximately six to nine years of age.
Chapter 2
Review of Related Literature

Introduction

There was no related research found which compared primary grade level males to primary grade level females in their separate abilities to recall auditory and visual stimuli. The research does exist on the subject of gender recall abilities is inconclusive in analyzing gender and the effect it has on memory. The research cited in this study was that which most closely related to gender differences and memory in both adults and children.

The Existence of Gender Stereotypes

Gender stereotypes was the topic of the research done by Herman & Crawford (1992). In their study they tested adult males and adult females in two specific tests. Both males and females in the group were asked to remember items on a shopping list. The subjects were then asked to remember road directions. These researchers found that women were able to recall stereotypically female tasks, in this case, a shopping list. Similarly, men had greater recall for road directions than did the female subjects in the study. The results of the research suggested that stereotypes do exist in adults and that sex differences in memory performance are predictable.
Although the Herman and Crawford study did not center around children, it did relate recall to gender-specific tasks. It did not, however, test auditory recall, only visual. There was no way to determine from this study whether gender stereotypes are substantiated when subjects are exposed to gender-specific auditory stimuli. Furthermore, the subjects were asked to recall verbatim either the lists or the road directions. There were not given a multiple choice test to elicit memory for the stimuli.

Stereotypical Behavior

Research was conducted to determine whether gender stereotypes had an effect on "differential memory" (Bardach & Park, 1996). Forty-nine men and sixty-two women were read a story in which "Marcia" and "Mark," fictitious characters, engaged in typical and a-typical gender-related behaviors. Although this study did not compare men to women, it did suggest that recall is effected by gender-related conduct, as the subjects remembered, with greater frequency, stereotypical behaviors performed by the characters in the story.

The subjects in the Bardach and Park study were adults, not children. Therefore, it was not determined by this study whether children would remember gender typical behaviors as well. Also, the study centered around auditory stimuli, as the characters were part of a story which was read to the subjects. No visual tests were given to the subjects. For example, the subjects did not see the characters performing gender typical and a-typical tasks. Furthermore, the subjects were simply asked to recall by listing what they remembered the
characters doing. The subjects were not given written tests, and the scores were based on the number of tasks the subjects remembered. Male and female responses were not compared.

Gender-typical Tasks

One study that tested children was conducted by Gary D. Levy (1995). Forty pre-school children were asked to recall gender-typical and a-typical tasks. His research found that, as with the adults in the Bardach and Park study, girls were more likely to recall female-specific tasks and boys male-specific tasks. As the above described studies sought to find relationships between perceived stereotypes and memory, they are important when ascertaining how gender and gender-related tasks are viewed by men and women in connection with notions of stereotypes.

Like the other studies, however, the subjects in the Levy study were only exposed to one type of stimuli, in this case, auditory. Children were not shown characters doing stereotypical behavior; they were read a story. The children were then asked questions to stimulate their memory.

Several other differences can be identified between the Levy study and the research conducted in the present study. The Levy children were pre-school age, or between the ages of three and five years. They were not primary grade level students with the ability to read or answer test questions. In contrast to the present study where a large number of subjects were tested, there were only forty students in the Levy study. This low number of subjects could hardly represent all pre-schoolers.
Gender and Recall in Adults and Children

Stereotypes were also the focus of another study, this conducted by Anooshian and Seibert (1996). This research sought to determine whether men and women differed in their ability to recall road directions, and consequently, whether male and female subjects across age groups varied in their recall of story characters. It was discovered that the female subjects had a greater capacity to recall both the road directions and the story characters than did the male subjects.

The 1996 Anooshian study is important to the present study in several areas. The Anooshian research assessed children as well as adults. In this way the Anooshian study does connect with the present research since children were used as subjects. Furthermore, the stimuli for the Anooshian study was visual for the adults and auditory for the children. Males and females were compared, but adults and children were also compared. However, the points of comparison between the Anooshian study and the present study end. The adults and children in the Anooshian study were not exposed to exactly the same stimuli. By contrast, the present study exposes all the children to the same stimuli and then compares males to females.

Gender and Cognitive Style

Another study testing children was conducted by Douglas and Riding (1995). Seventy-one children, age 11, were given two tests. The first test was a computer-based analysis of cognitive style. The second was a drawing assessment, where two different pictures were given to the children who were
expected to copy the first and draw the second from memory. Although the basis of the study was to differentiate between cognitive styles, the researchers found that females were superior to males in their ability to draw pictures from memory. This, the researchers concluded, was a significant finding. The findings of this study suggest that females are better able to draw from memory as are males.

Because the Douglas research broaches the subject of gender differences, it does enter into the same realm of gender recall as does the present study. The Douglas research focused on eleven year olds, not primary grade level students. No tests for overall visual and auditory recall were used, and boys and girls were compared on their ability to draw not to answer questions about stories and videos. In these contrasting areas, the Douglas study does not relate from the present study.

Gender Differences in Problem Solving Abilities

Although the Douglas study does seem to conclude that gender differences in memory do exist in children, other research, however, is inclusive when determining sex differences. Young and Wilson (1994) tested 28 girls and 24 boys, ranging in age from 5 to 11 years. In tasks related to matching, spatial memory, and ideational fluency, no "significant differences in problem-solving abilities" were found between males and females. Young and Wilson's research supports the hypothesis contained in this study that there is no significant difference between males and females in certain areas of recall. The Young study did not, however, limit itself to auditory and visual recall, but focused on
cognitive areas such as problem-solving and other skills, such as mathematical ability.

Conversely, in a 1996 study conducted by Robinson and Abbot, 778 preschool and kindergarten aged boys and girls were tested in spatial, verbal and quantitative abilities and it was concluded that males performed better on these tests than did their female counterparts. This research did not analyze memory, per se, but it is significant that it maintains that boys perform better than girls in mathematical ability, even at a young age. Although the conclusions of the Robinson study differ from the hypothesis of this study, the overall research centered on the differences between boys and girls and is therefore an important piece of research.

Conclusion About Gender and Memory Based on Research

On the whole, what the above described research concludes is that studies related to gender differences vary in their findings so much so that any proposed differential between males and females in their mental and recall abilities are, at best, tentative. Given the variability of these prior findings, any differences in gender must be related to specific tasks rather than overall recall ability. As this seems to be the case, this study maintains, unless the findings state otherwise, that there will be no significant difference between boys and girls in their capacity to remember either visual or auditory material.

There does, however, seem to be a difference between males and females in certain areas, which the current research suggests. Males and females exhibit stereotypical behavior (Herman & Crawford; Anooshian &
Seibert); and recall stereotypical behavior in other males and females (Bardach & Park; Levy). Boys and girls also differ in their cognitive abilities in some areas (Robinson & Abbott), but do not exhibit those differences in other areas (Young & Wilson).

But no research was found that specifically tested primary grade level subjects in both visual and auditory recall. Likewise, no research compared boys to girls in the area of visual and auditory memory. It becomes difficult to come to any definitive conclusion about gender and memory based on the above discussed research. The hypothesis that there is no significant difference between males and females in recall ability must be maintained.
Chapter 3
Procedures
Introduction

In order to test the hypothesis that there is no significant difference in the way primary grade level males and primary grade level females remember auditory and visual stimuli, the researcher conducted a study on males and females in grades one, two and three. The following content lists the ways in which this study was conducted, giving a detailed synopsis of the procedures used in this research.

Population

The population in this study was male and female public school children in first, second and third grade. These children ranged in age from six years to nine years.

Sample

The sample for this study was taken from a suburban school in New Jersey situated in a low socio-economic, culturally diverse community. Table 1 lists those subjects who were exposed to the audio cassette only (see table 1).
Table 1
Subjects Who Heard the Audio Cassette

<table>
<thead>
<tr>
<th>Number of Students Tested</th>
<th>Grade Level</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>3RD</td>
<td>MALE</td>
</tr>
<tr>
<td>16</td>
<td>3RD</td>
<td>FEMALE</td>
</tr>
<tr>
<td>13</td>
<td>2ND</td>
<td>MALE</td>
</tr>
<tr>
<td>13</td>
<td>2ND</td>
<td>FEMALE</td>
</tr>
<tr>
<td>17</td>
<td>1ST</td>
<td>MALE</td>
</tr>
<tr>
<td>24</td>
<td>1ST</td>
<td>FEMALE</td>
</tr>
</tbody>
</table>

Total Males - 52; Total Females - 53; Overall Total - 105

Table 2 lists those subjects who viewed the video only (see table 2). Although some of the students both heard the audio cassette and saw the video, the exact number of students were not exposed to both stimuli.

Table 2
Subjects Who Viewed the Video Cassette

<table>
<thead>
<tr>
<th>Number of Students Tested</th>
<th>Grade Level</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>3RD</td>
<td>MALE</td>
</tr>
<tr>
<td>15</td>
<td>3RD</td>
<td>FEMALE</td>
</tr>
<tr>
<td>9</td>
<td>2ND</td>
<td>MALE</td>
</tr>
<tr>
<td>12</td>
<td>2ND</td>
<td>FEMALE</td>
</tr>
<tr>
<td>17</td>
<td>1ST</td>
<td>MALE</td>
</tr>
<tr>
<td>25</td>
<td>1ST</td>
<td>FEMALE</td>
</tr>
</tbody>
</table>

Total Males - 46; Total Females - 52; Overall Total - 99

Procedure

The subjects were asked to listen to a short recording of the story Jackie Robinson, Baseball Hero. Although the person about which the audio cassette was named was familiar to some of the subjects, most of them were not acquainted with the topic. Those subjects who had heard the particular story on a previous occasion were eliminated from the study. No pictures in the story
were shown to the subjects.

Immediately after listening the audio cassette, a nine question multiple choice auditory test was administered to the subjects (see appendix A). This auditory test related to material in the story. The researcher read the auditory test to the subjects who were given an opportunity to select their responses by filling in a circle with a pencil mark. The researcher gave no cues or voice inflections that would signal which response was correct.

At the conclusion of the auditory test the subjects were asked to label their auditory test by circling either the word "BOY" if the subject was male, or "GIRL" if the subject was female. These labels were put at the top of the auditory test.

The researcher circulated the room as the auditory test was being collected to see whether the instructions had been carried out. The researcher did not ask the subjects to write their names on the test, but simply used the labels as an indication of the gender of the subjects.

The auditory tests were then separated by gender and were graded according to an answer key. (see appendix B).

The scores of the auditory tests given to the males were then compared to the scores of the auditory tests given to the females. These scores were used to determine whether any sex difference was apparent as it related to auditory recall.

Two weeks following the administration of the audio cassette and the test which related to the story of Jackie Robinson, the subjects were shown a short animated video entitled *Louis James Hates School*. Most of the subjects had no
prior knowledge of this story. Those who did were eliminated from taking the study.

Immediately after seeing the video, a nine question multiple choice video test was administered to the subjects. (see appendix C). This video test related to material in the video. The researcher read this video test to the subjects who were given an opportunity to select their responses by filling in a circle with a pencil mark. The researcher gave no cues or voice inflections that would signal which response was correct.

At the conclusion of the video test, the subjects were asked to label their test video by circling either the word "BOY" if the subject was male, or "GIRL" if the subject was female. These labels were put at the top of the video test. The researcher circulated the room as the video test was being collected to see whether the instructions had been carried out. The researcher did not ask the subjects to write their names, but simply used the labels as an indication of the gender of the subjects.

The video tests were then separated by gender and were graded according to an answer key (see appendix D).

The scores of the video tests given to the males were then compared to the scores of the video tests given to the females to determine whether any sex difference was apparent as it relates to visual recall.

Description of the Instruments

The instrument used in the auditory portion of the procedure was a nine question multiple choice auditory test entitled Jackie Robinson, Baseball Hero. On the top left of the auditory test the subjects were asked to "circle the answer."
Below this statement were the words "I am a BOY GIRL." The subjects were then asked to "Fill in the circle next to the correct answer." The questions were numbered from one to nine. The letters "a" through "d" were followed by circles in which the subjects could fill in the correct answer with a pencil mark. Each letter, "a" through "d" was followed by an answer choice. The auditory test was printed in large type so that primary grade level students could clearly see and select their answers.

The instrument used in the video portion of the procedure was a nine question multiple choice video test entitled Louis James Hates School. On the top left of the auditory test the subjects were asked to "circle the answer." Below this statement were the words "I am a BOY GIRL." The subjects were then asked to "Fill in the circle next to the correct answer." The questions were numbered from one to nine. The letters "a" through "d" were followed by circles in which the subjects could fill in the correct answer with a pencil mark. Each letter, "a" through "d" was followed by an answer choice. The video test was printed in large type so that primary grade level students could clearly see and select their answers.

Statistical Procedure

After the scores were ascertained for all 105 subjects taking the auditory test and all 98 subjects taking the visual test, each score was separated into the mean, median and mode for the male responses and the mean, median and mode for the female responses, based on the results of both the visual auditory and visual tests. A two-way analysis of (ANOVA) was then taken.
Chapter 4

Analysis of Findings

Introduction

It was the purpose of this study to determine whether there were any significant differences between the way boys and girls remember both visual and auditory stimuli. In order to examine these differences, two tests were given to the subjects of this study. The boys and girls in the first through third grades of the sample school were subjected to two stimuli, an auditory stimuli and a visual stimuli. The children were then given separate multiple choice tests after each stimuli was presented. Based on an extensive review of related literature, it was hypothesized that no significant difference would be determined between boys and girls in their ability to remember either visual or auditory stimuli. The following is a synopsis of the data which was compiled.

Tabulation of Raw Scores

There were nine questions on the auditory test and each answer was given a point value of 0 through 9. For example, if a subject answered all the questions correctly, that subject scored a value of 9. If a subject scored only three answers correctly, that subject was given a value of 3, and so forth. The frequency of scores was tabulated to limit space. After completion of the auditory test (see appendix A), the tests were separated by gender and a
tabulation of the raw scores was taken. The results are listed in table 3 below.

### Table 3

<table>
<thead>
<tr>
<th>Score</th>
<th>Boys Frequency</th>
<th>Score</th>
<th>Girls Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>1</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>11</td>
<td>8</td>
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</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Based on a total of 52 male subjects taking the auditory test, a mean score of 6.23 was determined for the boys' auditory scores, with a median score of 7 and a modal score of 7. Based on a total of 53 female subjects taking the auditory test, a mean score of 5.26 was determined for the girls' auditory scores, with a median score of 6 and a modal of score 6.

There were nine questions on the visual test and each answer was given a point value of 0 through 9. For example, if a subject answered all the questions correctly, that subject scored a value of 9. If a subject scored only three answers correctly, that subject was given a value of 3, and so forth. The frequency of scores was tabulated to limit space. After completion of the visual test (see appendix C), the tests were separated by gender and a tabulation of the raw scores was taken. The results are listed in table 4.
Based on a sample size of 46 boys taking the visual test, a mean score of 7.8 was determined, with a median score of 8 and a modal score of 9. Based on a sample size of 52 girls taking the visual test, a mean score of 7.11 was determined, with a median score of 8 and a modal score of 8.

Tabulation of the Two-way Analysis of Variance

After all the raw scores were tabulated and the mean, median and mode of each set of scores was determined, a two-way Analysis of Variance (ANOVA) was taken. The raw scores were listed individually and became the dependent variable. Males were given a numerical value of 1 and females a numerical value of two. Gender thus became one of the independent variables. Numerical values were also assigned to the two tests, with the auditory test receiving a value of 1 and the visual test a value of 2. The tests thus functioned as the other independent variable. The numerical values assigned to gender and to the two tests were number assignments only, and represented no scale value other than a random assignment of numbers. Table 5 is a tabulation of the ANOVA scores.
### Table 5
Tabulation of the two-way Analysis of Variance (ANOVA)

<table>
<thead>
<tr>
<th>Case Processing Summary(^a)</th>
</tr>
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<tbody>
<tr>
<td><strong>Included</strong></td>
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<tr>
<td>N</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>203</td>
</tr>
</tbody>
</table>

\(^a\) SCORE by GENDER, TEST

<table>
<thead>
<tr>
<th>ANOVA(^{a,b})</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unique Method</strong></td>
</tr>
<tr>
<td><strong>Sum of Squares</strong></td>
</tr>
<tr>
<td><strong>SCORE Main Effects</strong></td>
</tr>
<tr>
<td>GENDER</td>
</tr>
<tr>
<td>TEST</td>
</tr>
<tr>
<td><strong>2-way Interactions</strong></td>
</tr>
<tr>
<td>GENDER</td>
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<tr>
<td>Model</td>
</tr>
<tr>
<td>Residual</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

\(^{a}\) SCORE by GENDER, TEST
\(^{b}\) All effects entered simultaneously

### Analysis Related to Particular Purpose of Hypothesis

It was the hypothesis of this study that no significant difference would be discovered between the way boys and girls remember both auditory and visual stimuli. Based on a analysis of the scores as represented in the data above, the hypothesis can be supported in that no overall significance could be determined from the two-way interactions of gender as compared with both tests. Although there was a significant difference between the scores of the male subjects and the female subjects (.001), and between the scores of the visual and auditory tests (.000), when the test scores were compared to gender overall, no significant difference was determined (.561). In order for a significance to be found, the ANOVA significance score would have to be below .05.
Chapter 5
Summary, Conclusions, and Recommendations

Introduction

In this study, 52 boys and 53 girls were exposed to auditory stimuli and subsequently tested to see if any gender differences in ability to remember the stimuli occurred. Thereafter, 46 boys and 52 girls were exposed to visual stimuli and tested to determine if differences occurred in the way the separate genders recalled the visual stimuli. These subjects were taken from the first, second and third grade students of a suburban school in New Jersey. After the tests were administered, the tests were separated by gender and the mean, median and mode of the scores of both the auditory and visual tests were computed. A two-way Analysis of Variance (ANOVA) was then taken to determine what, if any, significant gender differences occurred. The following is a summary of the conclusions, recommendations, and implications this study ascertained.

Summary of the Problem

The problems this study sought to address was as follows: Do gender differences exist in primary grade level children? If so, do primary grade level males and females exhibit differences in the way they remember both auditory and visual stimuli? If exposed to visual stimuli, will boys and girls recall the material they saw at a different or equal rate? If exposed to auditory stimuli, will
boys and girls recall the material they heard at a different or equal rate?

Summary of the Hypothesis

It was the hypothesis of this study that there would be no significant difference between the ways males and females at the primary grade level remember both visual and auditory stimuli. This hypothesis was based on an extensive analysis of research on gender and memory. Since no verifiable conclusions could be determined from prior research, the hypothesis stated that no differences between genders in the area of memory ability would be determined.

Summary of the Procedure

In order to test the hypothesis, the subjects were exposed to two separate stimuli and then tested to determine their memory for that stimuli. First, 105 subjects, 52 boys and 53 girls, all from the primary grades, were read a story via audio tape. After hearing the story, the subjects were given a multiple choice test in which they were asked to answer nine questions about the material in the audio tape. The tests were separated by gender and the mean, median and modal scores were determined from the raw scores. The scores were then subjected to a two-way Analysis of Variance.

Forty-six boys and fifty-two girls, also primary grade level, were also exposed to visual stimuli via a videotape. A nine question multiple choice test was given based on the material in the video and the same statistical procedures performed on the raw scores of the auditory portion of the test were performed.
on this raw scores of the visual test. Determination was then ascertained whether significant differences existed between the way boys and girls remember auditory and visual stimuli.

Summary of Findings

When comparing the mean scores of the boys taking the auditory portion of the test to the mean scores of the girls taking the same test, it can be concluded that the boys scored slightly higher than the girls on a test of auditory memory. The boys' mean score of 6.23 is higher than the girls' score of 5.26 by .97. When analyzing the median scores for both boys and girls, however, the difference between the boys' score of 7 and the girls' score of 6 was even less significant. The modal scores of 7 for the boys and 6 for the girls, show the same slight variation.

Comparing the mean scores of the 46 males taking the visual portion of the test and the mean scores of the 52 girls taking the same test, it was concluded that only a slight variation can be determined between the scores. The boys scored a mean of 7.8 and the girls scored a mean of 7.11, only .31 lower than the boys. The median and modal scores were also insignificant, with the boys scoring a median of 8 and mode of 9 and the girls scoring a median of 8 and a mode of 8, respectively.

It can be concluded from an analysis of the mean, median and mode scores of both tests that boys scored only slightly higher than girls on both aspects of the study. This variation in scores can be a result of chance rather than of memory ability.
When subjecting the raw scores of the auditory and visual portions of the test to the two-way ANOVA, a high significance of .001 was determined comparing boys and girls overall, with the boys scoring higher than the girls on both tests. A significance was found if a value of lower than .05 was determined, so the value of .001 did represent a high significant difference. Further, when analyzing the scores comparing the auditory test scores to the visual test scores a further significance of .000 was determined, an even higher significant difference. Both boys and girls scored higher on the visual test than they did on the auditory test.

But when grouping the subjects together and looking at the overall scores, there was no significant difference between boys and girls. A score of .561, greater than .05, was ascertained on the data which compared the boys and girls on both auditory and visual tests. Therefore, the hypothesis of no significant difference between primary grade level boys and girls in tests of auditory and visual memory ability is supported.

Conclusions

Based on a statistical analysis of the scores, it can be concluded that boys scored significantly higher on both the visual and auditory portions of the study than did girls. It can also be determined that all subjects scored higher on the visual portion of the study than on the auditory portion. But when determining whether a significant overall difference exists between boys and girls on tests of auditory and visual memory skills, no significant difference could be determined. This conclusion can be ascertained from analyzing the mean, median and modal scores, as well as the scores on the two-way ANOVA.
Therefore, the hypothesis of no significant difference was supported.

Implications and Recommendations

There are several implications to this study. First, there was no significant difference in primary grade level boys and girls in auditory and visual memory skills. Second, boys do seem to do better than girls in overall memory performance. Third, children at this age and grade level do seem to score better on visual memory tests than on auditory memory tests. Taken as a whole, however, boys and girls in first, second and third grade do not seem to differ significantly in their ability to remember auditory and visual stimuli. What does this mean? It appears that if exposed to both auditory and visual stimuli, boys at the primary grade level will tend to perform only slightly better than girls. Furthermore, both boys and girls seem to remember visual stimuli more readily than they do auditory stimuli. When exposed to both auditory and visual stimuli, boys and girls in first, second and third grade tend to perform about the same when tested on the material they either hear or see.

Since only one school was tested, no definitive answers can be determined without further testing. It is therefore recommended that other children at this age level be tested in auditory and visual tests. Perhaps the limitations described in Chapter 1 of this study had some bearing on the results obtained herein. The subjects of this study should be tested again with similar stimuli to determine whether the scores on subsequent tests will differ from the scores obtained in this study.

This study tested primary grade level subjects. It is recommended that
older children be tested in a similar manner to determine whether age and grade level have some bearing on the results. Considering the ramifications of this study, it is also recommended that primary grade level students, both male and female, be exposed to many levels of stimuli.
SELECTED BIBLIOGRAPHY


Young Jackie Robinson, Baseball Hero

Circle the answer:

I am a  BOY    GIRL

Fill in the circle next the correct answer:

1. Jackie Robinson was born in
   a. O  Alabama.
   b. O  Georgia.
   c. O  Tennessee.
   d. O  California.

2. In the story there was a law that said that black children could not
   a. O  ride buses with white children.
   b. O  eat in the restaurant with white children.
   c. O  swim in the pool with white children.
   d. O  walk with white children.

3. When Jackie was not treated well he
   a. O  became the best athlete he could.
   b. O  got the best grades in school.
   c. O  had fights with the white children.
   d. O  told his mother.

4. In college Jackie starred in
   a. O  the school newspaper.
   b. O  the school tennis team.
   c. O baseball, basketball, football and track.
   d. O  the school hockey team.
5. During World War Two Jackie joined the
   b. O Navy.
   c. O Coast Guard.
   d. O Army.

6. In 1945 Jackie met a man named
   b. O Tom Brooklyn.
   c. O Branch Rickey.
   d. O John Dodger.

7. Jackie played for a team called the
   b. O Brooklyn Dodgers.
   c. O Florida Senators.
   d. O Philadelphia Phillies.

8. In his first year with the National League Jackie was named
   a. O Most Valuable Player.
   b. O Player of the Year.
   c. O The Best Baseball Player.
   d. O Rookie of the Year.

9. Jackie Robinson was the first black baseball player to
   a. O steal home plate.
   b. O get elected to the Baseball Hall of Fame.
   c. O win a trophy.
   d. O play in the World Series.
Appendix B
Young Jackie Robinson, Baseball Hero

Circle the answer:

I am a    BOY    GIRL

Fill in the circle next the correct answer:

1. Jackie Robinson was born in
   a. O Alabama.
   b. ☒ Georgia.
   c. O Tennessee.
   d. O California.

2. In the story there was a law that said that black children could not
   a. O ride buses with white children.
   b. O eat in the restaurant with white children.
   c. ☒ swim in the pool with white children.
   d. O walk with white children.

3. When Jackie was not treated well he
   a. ☒ became the best athlete he could.
   b. O got the best grades in school.
   c. O had fights with the white children.
   d. O told his mother.

4. In college Jackie starred in
   a. O the school newspaper.
   b. O the school tennis team.
   c. ☒ baseball, basketball, football and track.
   d. O the school hockey team.
5. During World War Two Jackie joined the
   a. ☒ Air Force.
   b. O Navy.
   c. O Coast Guard.
   d. © Army.

6. In 1945 Jackie met a man named
   b. O Tom Brooklyn.
   c. © Branch Rickey.
   d. O John Dodger.

7. Jackie played for a team called the
   b. © Brooklyn Dodgers.
   c. O Florida Senators.
   d. O Philadelphia Phillies.

8. In his first year with the National League Jackie was named
   a. O Most Valuable Player.
   b. O Player of the Year.
   c. © The Best Baseball Player.
   d. © Rookie of the Year.

9. Jackie Robinson was the first black baseball player to
   a. O steal home plate.
   b. © get elected to the Baseball Hall of Fame.
   c. O win a trophy.
   d. O play in the World Series.
Appendix C
Louis James Hates School

Circle the answer:

I am a    BOY    GIRL

Fill in the circle next the correct answer:

1. Louis James did not like school because he could not
   a. O add and subtract.
   b. O read or spell.
   c. O say his A B C's.
   d. O count to 10.

2. Louis James made a mistake and went into a
   a. O grocery store.
   b. O hat shop.
   c. O bakery.
   d. O candy store.

3. The man who gave out jobs was named
   a. O Mr. Thomas.
   b. O Mr. Smith.
   c. O Mr. Baker.
   d. O Mr. Klinker.

4. Louis James' first job was as a
   a. O police man.
   b. O pilot.
   c. O bus driver.
   d. O taxi driver.
5. The message Louis James had to write in the sky was
   a. O Buy Sam's Shoes.
   b. O Go to Joe's Diner.
   c. O Eat Crispy Cookies.
   d. O Taste Tasty Treats.

6. In his second job Louis James could not find the
   a. O rail road tracks.
   b. O hospital.
   c. O police station.
   d. O school.

7. Louis James got a job as a night watchman in a
   a. O haunted house.
   b. O circus.
   c. O hospital.
   d. O pickle factory.

8. Louis James was asked to taste
   a. O broccoli.
   b. O peas.
   c. O pickles.
   d. O spinach.

9. When his classmates asked Louis James where he had been, he answered
   a. O "working."
   b. O "reading books."
   c. O "just hanging out."
   d. O "doing nothing."
Appendix D
Louis James Hates School

Circle the answer:

I am a    BOY       GIRL

Fill in the circle next the correct answer:

1. Louis James did not like school because he could not
   a. O add and subtract.
   b. O read or spell.
   c. O say his A B C's.
   d. O count to 10.

2. Louis James made a mistake and went into a
   a. O grocery store.
   b. O hat shop.
   c. O bakery.
   d. O candy store.

3. The man who gave out jobs was named
   a. O Mr. Thomas.
   b. O Mr. Smith.
   c. O Mr. Baker.
   d. O Mr. Klinker.

4. Louis James' first job was as a
   a. O police man.
   b. O pilot.
   c. O bus driver.
   d. O taxi driver.
5. The message Louis James had to write in the sky was
   a. O Buy Sam's Shoes.
   b. O Go to Joe's Diner.
   c. O Eat Crispy Cookies.
   d. O Taste Tasty Treats.

6. In his second job Louis James could not find the
   a. O rail road tracks.
   b. Θ hospital.
   c. O police station.
   d. O school.

7. Louis James got a job as a night watchman in a
   a. O haunted house.
   b. O circus.
   c. O hospital.
   d. O pickle factory.

8. Louis James was asked to taste
   a. O broccoli.
   b. O peas.
   c. O pickles.
   d. O spinach.

9. When his classmates asked Louis James where he had been, he answered
   a. O "working."
   b. O "reading books."
   c. Θ "just hanging out."
   d. O "doing nothing."
VITA

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